[illegible]

Funktsional'no - invariantnyye resheniya volnovogo uravneniya. Trudy fiz.-matem. in-ta im. Steklova, 5 (1934), 259-264.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. I.

K voprosu ob analiticheskikh resheniyakh sistemy uravneniy v chastnykh proizvodnykh s dvumya nezavisimymi peremennymi. Trudy fiz. - matem. in-ta im. Steklova, 5 (1934), 265-282.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A.G.,
Markushevich, A.I.,
Rashevskiy, P.K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

Novyy metod resheniya zadachi koshi dlya uravneniya v chastnykh proizvodnykh vtorogo poryadka. Dan, 1 (1934), 433-438.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S.

Sobolev, S. "The Role of Mathematics in Present-Time Seismology". Front Nauki i Tekhniki, Moscow, No. 5/6, 1934, pp. 68-72.

SOBOLEV, S. L.

Obshchaya teoriya diffraktsii voln na rimanovykh poverkhnostyakh. Trudy fiz.-matem. in-ta im. Steklova, 9 (1935), 39-106.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S.

Sobolev, S., and Mikhlin, S. G. "Mathematical Seismology in the U.S.S.R." Uspekhi Matematicheskikh Nauk, Moscow-Leningrad, vol. 1, 1936, pp. 228-256.

SOBOLEV, S. L.

O pryamom metode resheniya poligarmonich-eskogo uravneniya. Dan, 4 (1936), 339-342.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

SOBOLEV, S. L.

Méthode nouvelle à résoudre le problème de Cauchy pour les équations linéaires hyperboliques normales. Matem. sb., 1 (43), (1936), 39-72.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

Algorifm Shvartsa v teorii uprugosti. Dan., 4 (1936), 235-238.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

Ob odnom klasse integro-differentsial'nykh uravneniy dlya neskol'kikh neza-visimykh peremennykh, I. Ian, ser. matem. (1937), 515-550.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

Ob odnoy krayevoy zadache dlya poligarmonicheskikh. Uravneniy. Matem. sb., 2 (44), (1937), 467-500.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

Volnovoye uravneniye dlya neodnorodnoy sredy. Trudy seysmol. in-ta, 6 (1937) 1-57.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L. (Prof.)

"Several Problems in the Theory of the Propagation of Vibrations," 1937.

Moscow Order Lenin State Univ. im. M. V. Lomonosov, 1941.

SOBOLEV, S. L.

Ob odnom klasse integro-differentsial'-nykh. Uravneniy s neskol'kimi nezavisimymi peremennymi, II. Izv. ser. matem. (1938), 61-90.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

Ob odnoy krayevoy zadache dlya poligarmonicheskikh uravneniy (avtoreferat). Uspekhi matem. nauk, 4 (1938), 275-277.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L. (Prof.)

"On the Theory of Non-linear Hyperbolic Equations with Partial Derivatives," 1939.

Moscow Order Lenin State Univ. im. M. V. Lomonosov.

SOBOLEV, S. L.

"On the Evaluation of Several Sums for the Given Functions on a System," Dokl. AN. 25, No. 7, 1939.

1. SOBOLEV, S. L.

2. USSR (600)

"Discussion of the Works of G. V. Shchipanov,"
Iz. AN SSSR, Otdel. Tekh. Nauk, No. 4, 1940.

9. [redacted] Report U-1530, 25 Oct 1951.

SOBOLEV, S. L.

Nekotoryye novyye krayevyye zadachi dlya uravneniy v chastnykh proizvodnykh. DAN, 32 (1941), 463-466.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

"Concerning the Problem of the Stability of Solutions to the Limited Problem for Equations with Partial Derivatives of the Hyperbolic Type," Dokl. AN No. 7, 1941.

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

SOBOLEV, S. L.

"Concerning Several Groups of Transformations in n-Dimensional Space," Dokl. AN, 32, No. 6, 1941.

Acad. of Sci.

SOBOLEV, S. L.

Nekotoryye novyye zadachi teorii uravneniy v chastnykh proizvodnykh giperbolicheskogo tipa. Matem. sb., 11 (53), (1942), 155-203.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

1. SOBOLEV, S. L.

2a. U.S.S.R. (600)

3. Mbr., Dept. Physico-Mathematical Sci., Acad. Sci (1944)

4. Mathematics

7. "Fundamental Problems in the field of Mathematics and Science," Vest. AN. SSSR, No. 11-12, 1944.

9. BR-52059019

SOBOLEV, S. L.

Soboleff, S. L. Sur la presque périodicité des solutions de l'équation des ondes. I. C. R. (Doklady) Acad. Sci. URSS (N.S.) 48, 542–545 (1945). [MF 16645]

Soboleff, S. L. Sur la presque périodicité des solutions de l'équation des ondes. II. C. R. (Doklady) Acad. Sci. URSS (N.S.) 48, 618–620 (1945). [MF 16640]

Soboleff, S. L. Sur la presque périodicité des solutions de l'équation des ondes. III. C. R. (Doklady) Acad. Sci. URSS (N.S.) 49, 12–15 (1945). [MF 16638]

After a theorem of Muckenhoupt for $n=1$ [J. Math. Phys. Mass. Inst. Tech. 8, 163–199 (1929)] it was proved by the reviewer [Acta Math. 62, 227–237 (1934)] that a solution $u=u(x_1, \cdots, x_n; t)$ of the wave equation (*) $\Delta u-\partial^2u/\partial t^2=0$, if compact as a function of t, is automatically almost periodic in t. The operator Δu in this statement is a fairly general elliptic operator over a suitable Hilbert space of functions of $(x_1, \cdots, x_n)$ in a domain; the "compactness" and "almost periodicity" refer to the function $u(x; t)$ as an abstract-valued function in t whose values are elements of the Hilbert space. In a paper by the reviewer and von Neumann [Ann. of Math. (2) 36, 255–291 (1935)] this was generalized to solutions of more general equations which are linear in t.

In the present notes the author is concerned in the case of equations (*) with drawing up assumptions under which the prerequisite compactness will be verified in order to be able to draw the conclusion that the trajectories are almost periodic (in the average). In note I he proves this compactness for the ordinary Laplacian simply under the alternate boundary conditions $u|_S=0$ or $\partial u/\partial n|_S=0$ with certain smoothness requirements on the boundary and differentiability conditions on $u(x; t)$. He obtains this conclusion by utilizing, in addition to the familiar energy integral $\int(\sum(\partial u/\partial x_i)^2+u^2)d\Omega$, which had been the only one used before, a new type of energy integral which involves partial derivatives of the second order, and whose constancy permits the conclusion (partly based on results of W. Kondrachov) that the partial derivatives of the first order in x are also compact. It is unlikely that the integral has not been noticed before, but its use in this type of problem seems to be novel.

In note II the author generalizes his conclusions from the Laplacian in rectilinear coordinates to one in curvilinear coordinates. In note III he returns again to the classical operator $\Box u=\sum(\partial^2u/\partial x_i^2)-\partial^2u/\partial t^2$; however, he admits "generalized" solutions of $\Box u=0$ for which no partial derivatives in x need exist. Such generalized solutions are defined by the adjoint equation $(u, \Box\phi)=0$, in which ϕ belongs to a large class of differentiable functions. The author proves again that the boundary condition $u|_S=0$ insures compactness and thus almost periodicity of the trajectory. The latter type of "generalized" solution by means of adjoint equations has also been treated in the meantime by the reviewer [Ann. of Math. (2) 47, 202–212 (1946); these Rev. 7, 446].

S. Bochner.

Source: Mathematical Reviews, Vol 8, No. 2

SOBOLEV, S. L.

O pochti periodichnosti resheniy volnovogo uravneniya, I. DAN, 48 (1945), 570-573.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

O pochti periodichnosti resheniy volnovogo uravneniya, II. Dan, 48 (1945), 646-648.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

O pochti periodichnosti resheniya volnovogo uravneniya, DAN, 49 (1945), 12-15.

SO: Mathematics in the USSR, 1917-1947
edited by Kurosh, A. G.,
Markushevich, A. I.,
Rashevskiy, P. K.
Moscow-Leningrad, 1948

SOBOLEV, S. L.

"Concerning the Near-Periodicity of the Solutions of the Wave Equation: II," Dokl. AN 48, No. 9, 1945.

SOBOLEV, S. L.

"Concerning the Near-Periodicity of the Solutions to the Wave-Equations. III," Dokl. AN., 49, No..1, 1945.

Acad. of Sci.

SOBOLEV, S. L.

"Equations of Mathmatical Physics", OGIZ. State Publishing House for Technical-Theoretical Literature. Moscow-Leningrad, 1947, 440 pages, 14 drawing, price 10 rubles 50 kopecks, binding 2 rubles, 10,000 printed.

SOBOLEV, S.L., akad.; FIKHTENGOL'TS, G.M., prof.

Academician V.I. Smirnov. Vest. LGU 2 no.6:155-157 Je '47.
(MIRA 12:9)
(Smirnov, Vladimir Ivanovich, 1887-)

PA 50T50

SOBOLEV, S.L.

USSR/Mathematics - Biography Nov/Dec 1947

"Vladimir Ivanovich Smirnov," S. L. Sobolev, 2 pp

"Uspekhi Matematicheskikh Nauk" Vol II, No 6 (22)

Brief biography of V. I. Smirnov written in honor of his 60th birthday and the 35th anniversary of his scientific endeavor. At present, professor at Leningrad State University, has written many articles on complex variables. On his 60th birthday is in excellent health, and can be expected to contribute many more productive years to the service of mathematics.

50T50

IC

PA21T56

Sobolev, S.L.

Jan 1947

USSR/Mathematics - Calculations
Mathematics, Applied

"The K-membered Tables of Functions of Three Variables, Shown as the Sum of the Products of Functions of One Variable," L Ya Neyshuler, 4 pp

"Dok Ak Nauk SSSR" Vol LV, No 3

Submitted by S L Sobolev 27 Jul 46. Mathematically expounds the statement that calculated formulae (containing three factors), are met in practicable calculations, most frequently shown as the sum of the products of the function, each from one variable, or the function from such a sum.

SOBOLEV, S. L.

In a bibliography of USSR works on Automatic Regulation and Servomechanisms 1917-1947, from Avtomatika i Telemekhanika, No. 5, 1948.

SMIRNOV, V.I., SOLEV, S.L.

N. M. Giunter. Uch. zap. LGU no.96:5-14 '48. (MLRA 10:8)
(Giunter, Nikolai Maksimovich, 1871-1941)

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

SOBOLEV, S. L.

Sobolev, S. L. Nekotorye primeneniya funkcional'nogo analiza v matematičeskoĭ fizike. [Some applications of functional analysis in mathematical physics.] Izdat. Leningrad. Gos. Univ., Leningrad, 1950. 255 pp. 16 rubles.

Chap. I, Special questions of functional analysis: Introduction; Fundamental properties of spaces L_p; Linear functionals in L_p; Compactness of spaces; Generalized derivatives; Properties of integrals of the type of a potential; Spaces $L_p^{(l)}$ and $W_p^{(l)}$; Embedding theorems; General methods of norming $W_p^{(l)}$ and consequences of an embedding theorem; Some consequences of embedding theorems; Complete continuity of the embedding operator (theorem of Kondrašev). Chap. II, Variational methods in mathematical physics: Dirichlet's problem; Neumann's problem; Polyharmonic equation; Uniqueness of solution of a fundamental boundary problem for the polyharmonic equation; Problem of characteristic values. Chap. III, Theory of hyperbolic differential equations: Solution of the wave equation with smooth initial conditions; Generalized Cauchy problem for the wave equation; Linear equation of normal hyperbolic type with variable coefficients (basic properties); Cauchy's problem for linear equations with smooth coefficients; Investigation of linear hyperbolic equations with variable coefficients; Quasi-linear equations. *Table of contents.*

SO: Mathematical Review Vol. 14, No. 6, pp 523-608, 1953.

SOBOLEV, S. L.

*Sobolev, S. L. **Uravneniya matematičeskoĭ fiziki.** [The Equations of Mathematical Physics]. 2d ed. Gosudarstv. Izdat. Tehn.-Teor. Lit., Moscow-Leningrad, 1950. 424 pp.

10

This book reproduces an introductory course taught by the author at the Moscow State University. For the most part it deals with the classical equations of potentials, heat-conduction and wave-propagation. The theory of integral equations is developed and used, and so is Lebesgue integration. The presentation is rigorous, clear and vivid.

L. Bers (Los Angeles, Calif.).

SMW
RB

Source: Mathematical Reviews, Vol 13 No. 1

~~ERUGIN, N.P.~~

SOBOLEV, S.L.

4
3

Erugin, N. P., and Sobolev, S. L. Approximate integration of some oscillating functions. Akad. Nauk SSSR. Prikl. Mat. Meh. 14, 193–196 (1950). (Russian)

Let $f(x)$ satisfy $|f^{(m)}(x)-f^{(m)}(x+h)| \leqq K_m|h|$, and let $\phi(x)$ be periodic with period k. A method for evaluation of the integral $J=\int_0^{nk} f(x)\phi(x)dx$ is contained in this paper. With the auxiliary function $\Phi_m(x)=\int_0^x \Phi_{m-1}(t)dt+k^{-1}\int_0^k t\Phi_{m-1}(t)dt$; $\Phi_0(x)=\phi(x)$, the authors find that if $\int_0^k \phi(x)dx=0$,

$$J=\sum_{i=0}^{m-1}[f^{(i)}(nk)-f^{(i)}(0)](-1)^i k^{-1}\int_0^k t\Phi_i(t)dt+(-1)^m J_m,$$

where $|J_m| \leqq 4MK_m n(k/4)^{m+2}$, $M \geqq |\phi(x)|$. Cases for which $\int_0^k \phi(x)dx \neq 0$ are also considered.

R. E. Gaskell.

Source: Mathematical Reviews, Vol 11 No. 10

SOBOLEV, S.L.

Keldyš, M. V., and Sobolev, S. L. Nikolaĭ Ivanovič Mushelišvili (for his sixtieth birthday). Uspehi Matem. Nauk (N.S.) 6, no. 2(42), 185–190 (1 plate) (1951). (Russian)

Source: Mathematical Reviews, Vol 13 No 1

SOBOLEV, S.L.

Sobolev, S. L. On the fiftieth birthday of Ivan Georgievič Petrovskii. Izvestiya Akad. Nauk SSSR. Ser. Mat. 15, 201-204 (1 plate) (1951). (Russian)
A list of Petrovskii's published papers is included.

Source: Mathematical Reviews, Vol 13 No. 1

SOBOLEV, S.L.

USSR/Mathematics - Partial Differential Equations 21 Dec 51

"A New Problem for Systems of Partial Differential Equations," Acad S. L. Sobolev, Math Inst imeni Steklov, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXXI, No 6, pp 1007-1009

Indicates a system of partial differential eqs which is not a system of Kovalevskaya, for which not only Cauchy's problem but also the mixed problem in an arbitrary smooth region stays rational. Submitted 31 Oct 51.

215T41

1. SOBOLEV, S. L.

2. USSR (600)

Mathematics - Sessions

Jan/Feb 52

"A New Problem of Mathematical Physics", Report at "Five Sessions of the Moscow Mathematical Society, Sept, and Oct. 1951". Uspekh Matemat Nauk" Vol. 7, No.1, (47), pp 130-150.

9. PA 204T26

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

Mathematical Reviews
Vol. 14 No. 7
July - August, 1953
Analysis.

Myškis, A. D. The simplest boundary problem for generalized systems of telegraph equations. Mat. Sbornik N.S. 31(73), 335–352 (1952). (Russian)

The method of separation of variables was used by N. A. Brazma [Doklady Akad. Nauk SSSR (N.S.) 76, 41–44 (1951); these Rev. 12, 657] to solve formally in terms of a series of normal modes the homogeneous vector-matrix telegraphic equation with simple boundary conditions. The present author develops, in continuation of previous work [Mat. Sbornik N.S. 30(72), 317–328 (1952); these Rev. 14, 51], an extensive rigorous theory justifying this expansion, covering also the inhomogeneous case. An important role is played in the investigation by the generalised solutions of S. L. Sobolev [Some applications of functional analysis in mathematical physics, Izdat. Leningrad Gos. Univ., 1950; these Rev. 14, 566] and by the concept of a "quadratically continuous" function. There are numerous theorems giving conditions on the initial data which ensure the convergence, in mean or uniformly, of the series solution, and various degrees of smoothness of the generalised or ordinary solution. The author proposes, as important unsolved problems, the cases of variable coefficients, or of more than two independent variables.

F. V. Atkinson (Ibadan).

SOBOLEV, S. L.

USSR/Mathematics - Cauchy's Problem 11 Jan 52

"Cauchy's Problem for the Partial Cases of Systems That Do Not Belong to the Kovalevskaya Type," Acad S. L. Sobolev, Math Inst imeni Steklov, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXXII, No 2, pp 205-208

Considers the fundamental solns of the eq $L\,\varpi = 0$ (e. g. $w = J_o(rtR^{-1})/R$) which for increasing t forms a system of waves on the surface of each sphere R=const. These waves arising on the equator move in the direction toward the poles accumulating continuously in greater

202T74

USSR/Mathematics - Cauchy's Problem 11 Jan 52 (Contd)

and greater quantity on the surface of the sphere. In this way large-scale waves generate from small-scale waves. Submitted 14 Nov 51.

202T74

SOBOLEV, S. L.

PA 245T74

USSR/Mathematics - Difference Equation 11 Nov 52

"Uniqueness of Solution of Difference Equations of the Elliptic Type," Acad S. L. Sobolev, Math Inst imeni Steklov, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 87, No 2, pp 179-182

Considers the difference equation of the following type:
$4Lu_{m,n} = u_{m+1,n+1} - u_{m-1,n-1} - u_{m+1,n-1} - u_{m-1,n+1} - 4u_{m,n} = 0$ for all values of m,n over the

245T74

xy-plane. Demonstrates that solution of this equation increases to infinity slower than $(m^2+n^2)^{\frac{1}{2}}$ and tends to a constant. Submitted 24 Sep 52.

245T74

PA 245T78

SOBOLOV, S. L.

USSR/Mathematics - Difference Equation 21 Dec 52

"A Difference Equation," Acad S. L. Sobolov, Math Inst imeni Steklov, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 87, No 3, pp 341-343

Considers the following difference equation. $w_{m+1,n+1} - w_{m-1,n-1} - w_{m+1,n-1} - w_{m-1,n+1} - 4w_{m,n} = 4$ (if $m^2+n^2=0$), or 0 (if $m^2+n^2>0$) for all values of m,n. Constructs the solution of this equation increasing to infinity as $\ln(m^2+n^2)^{\frac{1}{2}}$; also $w_{oo}=0$. States that such a solution is unique according to author's previous work ("Dok Ak Nauk SSSR" No 2 (1952)). Submitted 24 Sep 52.

245T78

SOBOLEV, S. L.

Jan/Feb 53

USSR/Mathematics - Societies

"Five Weekly Sessions (23 Sep - 21 Oct 52) of the Moscow Mathematical Society"

Usp Mat Nauk, Vol 8, No 1(53), pp 173-176

P. S. Aleksandrov, pres of the Society, urged members to assist in problems announced at the 19th Party Congress. The following reports were made: K. A. Sitnikov "Possibility of Capture in the Three-body Problem." S. L. Sobolev, "A Difference Equation." A. N. Kolmogorov "Spectra of Dynamic Systems on a Torus." A. V. Bitsadze, "The Mixed-type Equation $u_{xx}+\mathrm{sgn}\,y.u_{yy}=0$ of M. A. Lavrent'yev." L. N. Sretenskiy, "The Motion of the Goryachev-Chaplygin Gyroscope." I. N. Vekua, "Systems of Elliptic Equations." V. V. Nemytskiy, "Structure of the Spectrum of Nonlinear Operator Equations." A. P. Yushkevich, "Mathematics of Central Asian Peoples in the 9-15th Centuries." L. S. Sretenskiy vice pres of the Society suggested felicitations for member S. S. Byushgens on his 70th birthday.

PA 250T75

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

SOBOLEV, S.L.

PETROVSKIY, I.G.; VOVCHENKO, G.D.; SALISHCHEV, K.A.; SERGEYEV, E.M.; MOSKVITIN, V.V.; SRETENSKIY, L.V.; GEL'FOND, A.D.; GOLUBEV, V.V.; ALEKSANDROV, P.S.; SOBOLEV, S.L.; BAKHVALOV, S.B.; OGUBALOV, P.M.; KREYNES, M.A.; MYASNIKOV, P.V.; ZHIDKOV, M.P.; GAL'PERN, S.A.; ZHEGALKINA-SLUDSKAYA, M.A.

Vsevolod Aleksandrovich Kudriavtsev; obituary. Vest.Mosk.un. 8 no.12:129 D '53. (MLRA 7:2)
(Kudriavtsev, Vsevolod Aleksandrovich, 1885-1953)

KAMYNIN, L.I.; SOBOLEV, S.L., akademik.

Applicability of the method of finite differences in solving equations for thermal conductivity. Part 2. Izv.AN SSSR. Ser.mat. 17 no.3:249-268 '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Sobolev). (Differential equations, Partial) (Heat--Conduction)

1. SOBOLEV, S.L.

2. USSR (600)

4. Functions

7. General presentation of functions of two independent variables, permitting derivatives in S.L. Sobolev's interpretation, and the problem of primitives, I.N. Vekua. Dokl.AN SSSR 89 no. 5, 1953.

9. Monthly List of Russian Accessions, Library of Congress, APRIL 1953, Uncl.

SOBOLEV, S.L.

RUBINSHTEYN, L.I.; SOBOLEV, S.L., akademik.

Dynamics of the evaporation of ideal polycomponent fluid mixtures. Dokl. AN SSSR 90 no.6:987-990 Je '53. (MLRA 6:6)

1. Turkmenskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta g. Nebit-Dag (Rubinshteyn). 2. Akademiya nauk SSSR (for Sobolev).
(Evaporation) (Fluids)

BRUDNO, A.L.; SOBOLEV, S.L., akademik.

Norms for Toeplitz fields. Dokl. AN SSSR 91 no.1:11-14 Jl '53. (MLRA 6:6)

1. Akademiya nauk SSSR (for Sobolev).
(Spaces, Generalized) (Matrixes)

ALEKSANDRIYSKIY, B.I.; SOBOLEV, S.L., akademik.

Theory of certain linear integro-differential systems. Dokl. AN SSSR 91 no. 2:181-184 Jl '53. (MLRA 6:6)

1. Novosibirskiy inzhenerno-stroitel'nyy institut im. V.V.Kuybysheva. 2. Akademiya nauk SSSR (for Sobolev).
(Differential equations, Linear) (Integral equations)

BRUDNO, A.L.; SOBOLEV, S.L., akademik.

Relative norms for Toepli - matrixes. Dokl.AN SSSR 91 no.2:197-200 Jl '53.
(MLRA 6:6)

1. Akademiya nauk SSSR (for Sobolev). (Matrixes)

KIM, Ye.I.; SOBOLEV, S.L., akademik.

One class of an integral equation of the first order with a singular ker-nel. Dokl.AN SSSR 91 no.2:205-208 Jl '53. (MLRA 6:6)

1. Rostovskiy na Donu gosudarstvennyy pedagogicheskiy institut. 2. Akademiya nauk SSSR (for Sobolev). (Integral equations)

SOBOLEV, S.L.

RUBINSHTEYN, L.I.; SOBOLEV, S.L., akademik.

Dynamics of evaporation of polycomponent solutions with non-volatile solvent. Dokl.AN SSSR 91 no.4:767-769 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Sobolev). 2. Turkmenskiy filial VNII g. Nebit-Dag.
(Evaporation) (Solution (Chemistry))

ZHENKHEN, O.; SOBOLEV, S.L., akademik.

Existence of solutions for integral-differential equations. Dokl.AN SSSR 91 no.6:1261-1262 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Sobolev). 2. Gosudarstvennyy universitet im. Kim Ir Sena Koreya, Pkhen'yan.
(Integral equations) (Differential equations)

VAYNBERG, M.M.; SOBOLEV, S.L., akademik.

Structure of a certain operator. Dokl.AN SSSR 92 no.2:213-216 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Sobolev).
(Operators (Mathematics)) (Functions of real variables)

VAYNBERG, M.M.; SOBOLEV, S.L., akademik.

Solvability of certain operational equations. Dokl.AN SSSR 92 no.3:457-460 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Sobolev).
(Operators (Mathematics)) (Spaces, Generalized)

BLINOVA, Ye.N.; SOBOLEV, S.L., akademik.

Pressure determination at sea level. Dokl.AN SSSR 92 no.3:557-560 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Sobolev). 2. TSentral'nyy institut prognozov (for Blinova). (Atmospheric pressure)

TALDYKIN, A.T.; SOBOLEV, S.L., akademik.

Existence of eigenvalues and the completeness of systems of characteristic elements of linear operators. Dokl.AN SSSR 92 no.6:1121-1124 O '53.
(MLRA 6:10)

1. Akademiya nauk SSSR (for Sobolev). (Operators (Mathematics))

VISHIK, M.I.; SOBOLEV, S.L., akademik.

First boundary problem for elliptic equations, degenerate at the boundary of the domain. Dokl.AN SSSR 93 no.1:9-12 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Sobolev). (Differential equations)

VISHIK, M.I.; SOBOLEV, S.L., akademik.

Boundary problems for elliptic equations degenerating at the limit of a domain. Dokl.AN SSSR 93 no.2:225-228 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Sobolev). (Differential equations)

BRODSKIY, M.L.; SOBOLEV, S.L., akademik.

Asymptotic estimates of errors in numerical integration of systems of ordinary differential equations by methods of differences. Dokl.AN SSSR 93 no.4:599-602 D '53. (MLRA 6:11)

1. Akademiya nauk SSSR (for Sobolev). (Differential equations)

BURDINA, V.I.; SOBOLEV, S.L., akademik.

Boundedness of solutions of a system of differential equations. Dokl.AN SSSR 93 no.4:603-606 D '53. (MLRA 6:11)

1. Akademiya nauk SSSR (for Sobolev). (Differential equations)

Sobolev, S.L.

Sobolev, S. L. Uravneniya matematičeskoĭ fiziki. [The equations of mathematical physics.] 3d ed. Gosudarstv. Izdat. Tehn.-Teor. Lit., Moscow, 1954. 444 pp. 10 rubles. MS 1-F/W

This edition differs from the 2nd [1950; MR 13, 42] in only minor changes and corrections.

SOBOLEV, S.L.

Sobolev, S. L. On a new problem of mathematical physics. Izv. Akad. Nauk SSSR. Ser. Mat. 18, 3–50 (1954). (Russian) I-F/W

The author solves the initial-value problem for the following system of partial differential equations:

$$(*) \qquad \frac{\partial \mathbf{V}}{\partial t} - \mathbf{V} \times \mathbf{k} + \operatorname{grad} p = \mathbf{F}, \quad \operatorname{div} \mathbf{V} = g.$$

Here **F** is a given vector, g is a given function and **k** is a unit vector in the z-direction. The vector **V** and the function p are to be determined subject to the initial condition at time $t=0$ that **V** equal a given vector $\mathbf{V}_0$ for all points in a region R which may be the whole space or may be bounded by a closed surface S. In the latter case a boundary condition, such as $p=0$ on S or the normal component of $V=0$ on S, must be satisfied. The author uses the method of orthogonal projection in Hilbert space to show that (*) has a solution. If R is the whole space, a fundamental solution of the system is constructed and then by the use of generalized Green's formula an explicit solution of (*) is obtained. Finally, the

SOBOLEV, S. L.

author obtains an explicit solution of $\partial^2\Delta u/\partial t^2+\partial^2 u/\partial z^2=\phi$ with the initial conditions: $u=u_0$ and $\partial u/\partial t=u_1$ at time $t=0$.

B. Friedman (Berkeley, Calif.).

2/2

Sobolev, S. L. **On a new problem of mathematical physics.** Acad. Repub. Pop. Romîne. An. Romîno-Soviet. Mat.-Fiz. (3) 9, no. 1(12), 5–55 (1955). (Romanian)

Translation of the paper reviewed above.

Sobolev, S.L.

44-1-9

TRANSLATION FROM: Referativniy zhurnal, Matematika, 1957, Nr 1, p 1 (USSR)

AUTHORS: Sobolev, S.L., Kitov, A.I., Lyapunov, A.A.

TITLE: The Principal Features of Cybernetics (Osnovnyye cherty kibernetiki)

PERIODICAL: Vopr. Filosofii, 1955, Nr 4, pp 136-148

ABSTRACT: The article represents the first attempt at a serious study of the scientific content of cybernetics. Cybernetics is defined as a new scientific trend, created by N. Wiener, which is not, however, a sufficiently well-developed and complete scientific discipline. The main divisions of cybernetics, according to the authors, are: (1) information theory; (2) theory of computing machines, as a theory of self-organizing logical processes similar to human thinking; and (3) theory of automatic control systems, which includes the study, from the functional point of view, of the working processes of the nervous system, the sensory organs and other organs of living organisms. Attention is given to the mathematical apparatus of cybernetics, in particular to the study of information, with reference to the work of K. Shannon (collection of translations, "Transmission of Electrical Signals in the Presence of Interference", Moscow, 1953) and A. Ya. Khinchin (Math., 1954, 3771). The necessity of combating foreign reactionary

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point Q. The first of these theorems reads as follows:

$\varphi(E) \in \psi_{p}$ and $\omega(\vec{Q}, \vec{P})$ be continuous as functions of point $\vec{Q}$ in Ω. Then $U(\vec{Q})$ is a continuous abstract function of point $\vec{Q}$. The concept of the derivation of an abstract function of the sets is also introduced. The proof of the theorems given in this paper is based on the transition to "medium" (averaged?) functions. There are 4 Slavic references, no figures.

ASSOCIATION: Mathematical Institute im. V. A. Steklov, AN SSSR (Matematicheskiy institut im. V.A. Steklova Akademii nauk SSSR)

SUBMITTED: February 22, 1957

AVAILABLE: Library of Congress

Card 2/2

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

20-114-6-9/54

AUTHOR: Sobolev, S. L., Member of the Academy

TITLE: The Extensions of Abstract Function Spaces Connected With the Theory of the Integral (Rasshireniya prostranstv abstraktnykh funktsiy, svyazannyye s teoriyey integrala)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr. 6, pp. 1170-1173 (USSR)

ABSTRACT: The integration of abstract functions is suitably constructed by limiting the integration operator

$$\int_{\Omega} \varphi(\vec{P})\, dP$$

(which is defined in the quantity $\mathfrak{M}$ of the graduated functions $\varphi(\vec{P})$ with the values of the Banakh space X. This operator is thus defined for functions which are assumed by the equation

$$\varphi(\vec{P}) = \xi_i, \quad \vec{P} \ni E_i \qquad (i = 1, 2, \ldots N)$$

In that connection the ξ_i signify certain elements of X and the quantities E_i - signify in the sense of Lebesgue measurable

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SOBOLEV, S. L. and LYAPUNOV, A. A.

"Cybernetics and Natural Science," Voprosy filosofii [Problems of Philosophy], 1958, No. 5, Pages 127 - 138.

VISHIK, M.I.; SOBOLEV, S.L., akademik.

General formulation of certain boundary problems for elliptical differential equations with partial derivatives. (MLRA 10:2)
Dokl. AN SSSR 111 no.3:521-523 N '56.

(Differential equations, Partial) (Functional analysis)

SO: REPORT, 1956-57, Ministry of Natural Resources, and Scientific Research, India

Lectures:

Bose Institute.

"Time in Biology" by Prof. J. B. S. Haldane, in September, 1956

Indian Mathematical Society

1. "The Nature of Space" by Dr. K. S. Krishnan, in December, 1955.

2. "The Extension of the Universe" by Dr. G. S. Mahajani in December, 1956.

Calcutta Mathematical Society.

1. "The Closure of Numerical Logarithms and some of its Applications" by Academician S. Sobolev, in January, 1956

2. "Prediction Theory and Operational Analysis" by Prof. Norbert Wiener, in March, 1956.

Indian Chemical Society.

1. "L. Melanin" by Prof. R. G. Clemo in January, 1956

2. "Principal Methods of Study of Terrestrial and Soil Insects Damaging Agricultural Crops, Trees and Shrubs" by Academician D. Fedatov, in January, 1956.

3. "Recent Advances in Physics in the Service of Chemistry" by Prof. S. N. Bose, in August, 1956.

Zoological Survey of India.

"The Role of Taxidermy in India", March, 1956

SEMINARS

Bose Institute.

"On the Application of Nuclear Energy to Medicine, Agriculture and Industry, Research Reactors and Science in General", in April, 1956.

29. VIGYAN MANDIR

A scheme for the establishment of Rural Scientific Centres, known as 'Vigyan Mandirs', was started by this Ministry in August, 1956, and well-equipped small scientific laboratories are being set up in selected villages in various parts of the country. The object of the 'Vigyan Mandirs' is to educate the villagers on the potentialities of the methods of science in their day-to-day life.

Fourteen Vigyan Mandirs have been already established at Kapashera (Delhi), Masauli (U.P.), Kallupatti (Madras), Coimbatore (Madras), Pudur Ramavermapuram (Kerala), Pishanganj and Sumerpur (Rajasthan), Sehore (M.P.), Shapur (Bombay), Vikarabad

SOBOLEV, S. L. and LYAPUNOV, A. A.

Kibernetika i estestvoznaniye /Cybernetics and Natural Science/, Publishing House of the Academy of Sciences USSR, 1957, 26 pages. (Material for the All-Union Conference on Philosophical Problems of Natural Science).

LAVRENT'YEV, M.A.; SOBOLEV, S.L.

Il'ia Nestorovich Vekua; on the occasion of his 50th birthday. Usp.mat.nauk 12 no.4:227-234 Jl-Ag '57. (MIRA 10:10)
(Vekua, Il'ia Nestorovich, 1907-)

SOBOLEV, S.L.

A. M. Liapunov's work in the theory of potential. Prikl.mat. i mekh. 21 no.3:306-308 My-Je '57. (MIRA 10:10)
(Potential, Theory of)

L 12833-63 EWT(d)/FCC(w)/BDS AFFTC IJP(C)
S/0020/63/150/006/1238/1241

ACCESSION NR: AP3003216 52 51

AUTHOR: Sobolev, S. L. (Academician)

TITLE: Application of computation factor to formulas of mechanical volumes

SOURCE: AN SSR Doklady, v. 150, no. 6, 1963, 1238-1241

TOPIC TAGS: computation factor, mechanical volume, Fourier representation, Dirac function, degree of polynomial, polynomial

ABSTRACT: The problem is to determine the coefficients of equation (1) of the Enclosure such that the functional l(x), defined by equation (2) of the Enclosure vanishes on all polynomials of degree m-1. For a finite case, a necessary and sufficient condition that l(x) vanishes on all polynomials of degree m-1 is that its Fourier representation should have a root of order m at the origin. An analogous theorem is given in the case of unbounded regions. Orig. art. has: 6 formulas.

Association: Inst. of Mathematics with Computer Center, Siberian Division

Card 1/2

SOBOLEV, S. L.

1-F/W

Sobolev, S. L. Remarks on the numerical solution of integral equations. Izv. Akad. Nauk SSSR. Ser. Mat. 20 (1956), 413–436. (Russian)

The paper begins by describing the notion of the closure of a numerical algorithm; thus the relaxation algorithm for solving a boundary value problem for a partial differential equation has as its closure a set of equations describing the 'diffusion' of the boundary values over the whole domain. The closure of an algorithm is said to be regular if the linear operators describing it are bounded in the appropriate function spaces.

The author applies these ideas to the solution of linear integral equations of the second kind by algorithms in which (i) the equation is approximated by a finite set of linear equations in a finite number of variables, and (ii) the latter system is solved by successive elimination of the unknowns.

To analyse part (i) of the process, the author defines a regular approximation to a completely continuous operator A as being a uniformly completely continuous sequence (A_n) of operators converging strongly to A. He proves that if (A_n) is such a sequence, and $(I-A)^{-1}=I+\Gamma$ exists, then $(I-A_n)^{-1}=I+\Gamma_n$ exists for all sufficiently large n, and (Γ_n) is a regular approximation to Γ.

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Sobolev, S. L.

Now let A be the operator defined by a continuous kernel $K(x, y)$ in the space $C[0, 1]$, and let

$$A_N\varphi = \sum_{n=1}^{N} K_n(x)\varphi(t_n) \quad (N \geqq 1),$$

where $t_n = (n-\frac{1}{2})h$, $K_n(x) = hK(x, t_n)$, $h = (N+1)^{-1}$; then (A_N) is a regular approximation to A. Other regular approximations to integral operators are also described.

The closure of the above algorithm is described by equations of the form

$$\varphi(x) - \int_s^1 \Gamma(x, y, s)\varphi(y)dy = f(x) + \int_0^s \Gamma(x, y, s)f(y)dy,$$

where $\Gamma(x, y, 0) = K(x, y)$, $\Gamma(x, y, 1) = \Gamma(x, y)$ and s runs from 0 to 1. The author shows that the closure is regular if and only if none of the equations

$$\varphi(x) - \int_0^s K(x, y)\varphi(y)dy = \psi(x),$$

where $0 < s \leqq 1$, is singular; when this holds, and only then, the algorithm described will give results of arbitrarily high accuracy for sufficiently large N. A simple example is given of an equation for which the closure of this algorithm is not regular. The paper concludes with some formal properties of the family of kernels $\Gamma(x, y, s)$.

F. Smithies (Cambridge, England).

Sobolev, ~~S. I.~~ S. L.

3
1-4E

Sobolev, S. L. An instance of a correct boundary problem for the equations of string vibration with the conditions given all over the boundary. Dokl. Akad. Nauk SSSR (N.S.) 109 (1956), 707–709. (Russian)

Let $u_1=\partial U/\partial t$, $u_2=\partial U/\partial x$. The system

(*) $$\partial u_1/\partial t=\partial u_2/\partial x,\ \partial u_2/\partial t=\partial u_1/\partial x$$

is equivalent to the equation of the vibrating string. Let the functions u_1, u_2 satisfy on the sides of the square $-1\leq x\leq 1$, $-1\leq t\leq 1$ the conditions

$$[a_1(t)u_1+b_1(t)u_2]_{x=-1}=f_1(t),\ [a_3(x)u_1+b_3(x)u_2]_{t=-1}=f_3(x)$$

plus two similar conditions on the sides (**) $x=1$, $t=1$. Under broad assumptions on the functions a, b, the problem of solving (*) subject to (**) is correctly set. The general solution of (*) is $u_{1,2}=\phi_1(x+t)\pm\phi_2(x-t)$. Application of the boundary conditions leads to a system of four algebraic equations which are uniquely solvable if the determinant Δ is nonvanishing. When Δ has zeros of finite multiplicity at isolated points, one must impose additional conditions on $f_1, \cdots, f_4$. In the general case one can construct solutions using Green's formula. The author promises a forthcoming work on the correct formulation of boundary-value problems for differential equations of a general type, of which the present note treats merely a simple example. *R. N. Goss* (San Diego, Calif.).

SOBOLEV, S. L. (Acad.) and LYAPUNOV, A. A. (Prof.)

"Cybernetics and the Natural Sciences."

report presented at All-Union Conference on Philosophical Questions of the Natural Sciences. Moscow Scientists Club, 22 Oct 58

SOV/20-121-4-7/54

AUTHOR: Sobolev, S.L. (Academician)

TITLE: Remarks on the Criterion of Petrovskiy of the Uniform Correctness of Cauchy's Problem for Partial Differential Equations (Zamechaniya o kriterii Petrovskogo ravnomernoy korrektnosti zadachi Koshi dlya uravneniy v chastnykh proizvodnykh)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 4, pp 598-601 (USSR)

ABSTRACT: Let the Cauchy problem

(1) $$Lu = \frac{\partial^n u}{\partial t^n} + \sum_{k<n} A_{kl} \frac{\partial^{k+l} u}{\partial t^k \partial x^l} = F$$

(2) $$u\Big|_{t=o} = \frac{\partial u}{\partial t}\Big|_{t=o} = \dots = \frac{\partial^{n-1} u}{\partial t^{n-1}}\Big|_{t=o} = 0$$

be given. In order that (1) - (2) possesses a solution in an infinite domain continuously depending on the constants A_{kl} and on the right side F, according to Petrovskiy, it is necessary and sufficient that for purely imaginary α the equation

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Remarks on the Criterion of Petrovskiy of the Uniform Correctness of Cauchy's Problem for Partial Differential Equations

$$(3) \qquad \Delta(\lambda,\alpha) = \lambda^n + \sum_{k<n} A_{kl}\lambda^k\alpha^l = 0$$

possesses only roots which lie on the left of a certain straight line $\sigma > \sigma_0$, where $\lambda = \sigma + it$. In this case L is called an operator of Petrovskiy. The operator

$$(4) \qquad Lu \equiv \left(\frac{\partial}{\partial t} - A\frac{\partial^m}{\partial x^m}\right)u$$

is called an elementary operator of Petrovskiy. If m is even and $\left|\arg\left[(-1)^{k+1}A\right]\right| < \frac{\pi}{2}$, then (4) is called strongly parabolic. If m is odd or $\left|\arg\left[(-1)^{k+1}A\right]\right| = \frac{\pi}{2}$, then (4) is called semihyperbolic.

Theorem: The operator $Lu \equiv \left(\frac{\partial^n}{\partial t^n} - B\frac{\partial^p}{\partial x^p}\right)u$ is an operator

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SOV/20-121-4-7/54

Remarks on the Criterion of Petrovskiy of the Uniform Correctness of Cauchy's Problem for Partial Differential Equations

of Petrovskiy if and only if $n = 2$, $p = 2m$ and if the factors

$$\frac{\partial}{\partial t} \pm \sqrt{B}\, \frac{\partial^m}{\partial x^m}$$

are semihyperbolic operators of Petrovskiy.

Theorem : Every operator of Petrovskiy is representable as a product of elementary operators of Petrovskiy :

$$Lu \equiv \prod_{s=1}^{n} \left(\frac{\partial}{\partial t} - A_s \frac{\partial^{m_s}}{\partial x^{m_s}} \right) u + L_2 u \quad ,$$

where $L_2 u$ contains the terms of lower order. By the expansion of the root λ of (3) in terms of powers of α

$$\lambda = A_o \alpha^m + A_1 \alpha^{m-\frac{1}{s}} + \dots + A_{m_s} + \dots .$$

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Remarks on the Criterion of Petrovskiy of the Uniform SOV/20-121-4-7/54
Correctness of Cauchy's Problem for Partial Differential Equations

and formation of symmetric functions from the conjugate roots (i.e. from those which arise by the sustitution

$$\alpha^{1/s} \rightarrow \alpha^{1/s} \cdot e^{2k\pi i/s}$$

) the author obtains certain canonical operators of Petrovskiy. It is shown that every operator of Petrovskiy differs only by unessential terms from a product of canonical operators.
There is 1 Soviet reference.

SUBMITTED: April 19, 1958

Card 4/4

SOV/89-5-2-15/36

AUTHORS: Sobolev, S. L., Mukhina, G. V.

TITLE: The Determination of Thermal Stresses in a Medium Containing Cavities (Opredeleniye termicheskikh napryazheniy v srede s pustotami)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 2, pp. 178-181 (USSR)

ABSTRACT: When calculating some types of fuel elements it is essential to solve the following mathematical problems:
A body with a uniformly distributed heat emission Q with respect to its entire volume exists. The body is subdivided by cylindrical channels which have circular cross sections the axes of which are parallel to one another. Heat removal takes place only by the surface of the channels and the surface temperature is constant and equal in all channels. The body is able to expand freely in all directions. The demand is made to find the maximum dilatation-, compression- and shearing stresses in the body under the following conditions:

1.) No exterior forces act upon the body and it is influenced only by the interior thermal stresses.
2.) The maximum drop in temperature in the body is not high and the material properties of the body do not change within this

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APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

The Determination of Thermal Stresses in a Medium Containing Cavities SOV/89-5-2-15/36

range of temperature.

3.) All stresses produced in the material of the body in no case exceed the limits of the elastic deformations and the properties of the material are isotropic in all directions.

The problem of calculating the elastic stresses is carried out by means of the variation method according to Ritz.
By the introduction of the function according to "Eri" (Airy?) the problem is reduced to the determination of a maximum of the integral:

$$\iint\left[(\Delta U)^2-2qU\right]dxdy.$$

When using this method the selection of the most suitable system of the function on which the approximated solution is based is of essential importance. It is shown that the function according to "Eri" is suitable for the solution of the problem in question.
A simple method is given for the determination of the approximated solution. There are 5 figures.

Card 2/3

SOV/20-122-4-4/57

AUTHOR: Sobolev, S.L., Academician

TITLE: On Mixed Problems for Partial Differential Equations With Two Independent Variables (O smeshannykh zadachakh dlya uravneniy v chastnykh proizvodnykh s dvumya nezavisimymi peremennymi)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 4, pp 555-558 (USSR)

ABSTRACT: The equation with constant coefficients

$$\frac{\partial^n u}{\partial t^n} + \sum_{k<n,\, l\leq m} A_{k,l} \frac{\partial^{k+l} u}{\partial t^k \partial x^l} = f \qquad (1)$$

already considered by the author in [Ref 1] is investigated in the domains

D_1 : $-\infty < x < \infty$, $0 \leq t < +\infty$

D_2 : $0 \leq x < \infty$, $0 \leq t < +\infty$

D_3 : $0 \leq x \leq 1$, $0 \leq t < +\infty$

Initial conditions are :

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On Mixed Problems for Partial Differential Equations With Two Independent Variables SOV/20-122-4-4/57

$$u\Big|_{t=0} = \frac{\partial u}{\partial t}\Big|_{t=0} = \dots = \frac{\partial^{n-1} u}{\partial t^{n-1}}\Big|_{t=0} = 0$$

boundary conditions are

$$\sum_{i=1}^{m-1} g_t^{(s)} \frac{\partial^i u}{\partial x^i}\Big|_{x=0} = 0 \text{ , } s = 1,2,\dots,q_- \text{ , }$$ in the cases D_2 and D_3

and $$\sum_{i=1}^{m-1} h_i^{(s)} \frac{\partial^i u}{\partial x^i}\Big|_{x=1} = 0, \quad s = 1,2,\dots,q_+$$ in the case D_3. The solution is sought with the aid of the Laplace transformation.

Let $\Delta(\lambda, \alpha) = \lambda^n + \sum_{k<n, l\leq m} A_{k,l}\lambda^k \alpha^l$ furthermore let r_- be the number of the roots of the equation $\Delta(\lambda, \alpha) = 0$ lying in the left semiplene and r_+ the number of the roots in the right semiplane.

Theorem: The problem is in general solvable in D_2 and possesses

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On Mixed Problems for Partial Differential Equations With Two Independent Variables SOV/20-122-4-4/57

a unique solution, if $q_- = r_-$. In particular, it is solvable, if the boundary conditions have the form

$$\left.\frac{\partial^k k}{\partial x^k}\right|_{x=0} = 0 \quad , \quad k = 0,1,\dots,r_-$$

Theorem: The problem is in general solvable in D_3 , the solution is unique, if $q_- = r_-$ and $q_+ = r_+$.

There are 2 Soviet references.

SUBMITTED: July 17, 1958

Card 3/3

Sobolev, S.L.

PHASE I BOOK EXPLOITATION SOV/3493

Vsesoyuznoye soveshchaniye po filosofskim voprosam yestestvoznaniya

Filosofskiye problemy sovremennogo yestestvoznaniya; trudy soveshchaniya...(Philosophic Problems of Modern Natural Science; Transactions of the All-Union Conference on Philosophic Problems of Natural Science) Moscow, Izd-vo AN SSSR, 1959. 663 p. Errata slip inserted. 6,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR.

Ed. of Publishing House: A.I. Kompaneyets; Tech. Ed.: I.N. Dorokhina; Editorial Committee: P.N. Fedoseyev, Corresponding Member, Academy of Sciences USSR (Chairman), B.M. Vul, Corresponding Member, Academy of Sciences USSR, M.E. Omel'yanovskiy, Academician, Academy of Sciences UkrSSR, N.M. Sisakyan, Corresponding Member, Academy of Sciences USSR, V.N. Stoletov, Professor, and Ye.N. Chesnokov, Candidate of Philosophical Sciences (Scientific Secretary)

PURPOSE: This book is intended for natural scientists and philosophers who are interested in coordinating Communist philosophy with science.

COVERAGE: This is a publication of the transactions of the All-Union Conference on Philosophic Problems of Natural Science which took place in Moscow, October 21-25, 1958. The Conference was attended by 20 academicians and 30 corresponding members of the Academy of Sciences USSR, 15 academicians and 34 members of republic and special academies, 186 university and college workers, 240 workers of scientific research institutes, and 75 party officials. The purpose of the Conference, as expressed by the Chairman of the Organization Committee, K.V. Ostrovityanov, was to unite the efforts of Soviet philosophers and scientists in the dialectical-materialistic interpretation of the achievements of modern science, and to provide the philosophical background required for the study of modern scientific problems.

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16(1) SOV/42-14-2-14/19

AUTHORS: Oleynik, O.A., and Sobolev, S.L.

TITLE: Partial Differential Equations at the International Congress in Edinburgh

PERIODICAL: Uspekhi matematicheskikh nauk, 1959, Vol 14, Nr 2, pp 247-250 (USSR)

ABSTRACT: This is a report on the deliveries and opinions of western mathematicians on the subject of "partial differential equations". Soviet deliveries are not mentioned. Incidentally the authors mention I.G. Petrovskiy, A.D. Myshkis, M.I. Vishik, Landis, and Pliss.

Card 1/1

MUKHINA, G.V. (Moskva); SOBOLEV, S.L. (Moskva)

Solution of a boundary value problem. Prikl. mat. i mekh. 23 no.3:534-539 My-Je '59. (MIRA 12:5)
(Differential equations)

SOBOLEV, S.L. (Moskva-Novosibirsk)

Certain generalizations of the embedding theorems. In Russian. Fund. mat. 47 no.3:277-324 '59. (EEAI 9:5)
(Functions) (Transformations (Mathematics))

68150
SOV/20-129-6-13/69

~~16(1)~~ 16,3500

AUTHOR: Sobolev, S.L., Academician

TITLE: The Fundamental Solution of Cauchy's Problem for the Equation $\frac{\partial^3 u}{\partial x \partial y \partial z} - \frac{1}{4} \frac{\partial u}{\partial t} = F(x,y,z,t)$

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 6, pp 1246-1249 (USSR)

ABSTRACT: The author obtains the solution of the equation

$$(2) \quad \frac{\partial^3 G}{\partial x \partial y \partial z} - \frac{1}{4} \frac{\partial G}{\partial t} = \delta(x,y,z,t)$$

which vanishes for $t<0$. Let

$$(3) \quad G(\alpha x, \beta y, \gamma z, \alpha\beta\gamma t) - \frac{1}{\alpha\beta\gamma} G(x,y,z,t) = \psi(x,y,z,t \mid \alpha,\beta,\gamma)$$

From (2) it follows $\psi \equiv 0$, so that it is

$$(4) \quad G(\alpha x, \beta y, \gamma z, \alpha\beta\gamma t) = \frac{1}{\alpha\beta\gamma} G(x,y,z,t)$$

From this there follows the possibility of the representation

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The Fundamental Solution of Cauchy's Problem for the Equation $\frac{\partial^3 u}{\partial x \partial y \partial z} - \frac{1}{4}\frac{\partial u}{\partial t} = F(x,y,z,t)$

(5) $G = \frac{1}{t}\Lambda\left(\frac{xyz}{t}\right)$

If (5) is substituted into (2), then for the determination of $\Lambda(\xi)$, where $\xi = \frac{xyz}{t}$, the author obtains

(6) $\left(\xi\frac{d}{d\xi} + 1\right)\left(\xi\frac{d^2}{d\xi^2} + \frac{d}{d\xi} + \frac{1}{4}\right)\Lambda = 0$

The equation (6) is integrable in Bessel functions, so that for $\xi > 0$ there holds e.g.

(7) $\Lambda_1(\xi) = c_1^{(1)} I_0(\sqrt{\xi}) + c_2^{(1)} Y_0(\sqrt{\xi}) + c_3^{(1)} \int_\infty^\xi \left[I_0(\sqrt{\xi})Y_0(\tau') - Y_0(\sqrt{\xi}) I_0(\tau')\right]\frac{d\tau'}{\tau'}$

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The Fundamental Solution of Cauchy's Problem for SOV/20-129-6-13/69

the Equation $\frac{\partial^3 u}{\partial x \partial y \partial z} - \frac{1}{4} \frac{\partial u}{\partial t} = F(x,y,z,t)$

Now the author shows by direct examination that the fundamental solution of the title equation and the solution G of (2) respectively have the form :

(8)
$$G(x,y,z,t) = \begin{cases} = 0 & \text{for } t < 0 \\ -\frac{1}{2\pi}\frac{1}{t} Y_0\left(\sqrt{\frac{xyz}{t}}\right) & \text{for } t > 0, \quad xyz > 0 \\ \frac{1}{\pi^2} \cdot \frac{1}{t} K_0\left(\sqrt{\frac{-xyz}{-t}}\right) & \text{for } t > 0, \quad xyz < 0 \end{cases}$$

The author mentions I.G. Petrovskiy. - There is 1 Soviet reference.

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SUBMITTED: September 17, 1959

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SOBOLEV, S. L.

"O formulah mekhaniceskih kvadratur;"

Report submitted for the Conference on Functional Analysis, Warsaw, 4-10 Sep 60

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651820017-0"

SOBOLEV, S.L. (Novosibirsk)

Motion of a symmetrical gyroscope having a cavity filled with a liquid. PMTF no.3:20-55 S-O '60. (MIRA 14:7)
(Gyroscope)

S/030/60/000/010/002/018
B021/B058

AUTHORS: Lyusternik, L. A., Corresponding Member AS USSR,
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TITLE: Problems of Computer Mathematics

PERIODICAL: Vestnik Akademii nauk SSSR, 1960, No. 10, pp. 23-31

TEXT: The authors endeavor to establish only some characteristic trends in the development of computer mathematics. The ever increasing fields of application of mathematics and of problems to be solved led to a great increase of the volume and variety of computations. Special computer installations were necessary therefore. The development of new means of computation techniques was of great influence on computer mathematics, requiring the training of operating personnel. Courses for laboratory assistants, computer operators and programmers are held in a number of organizations in Moscow and Novosibirsk. The first schools with a computer-mathematics trend have been established in Moscow. Statistical data on the Vychislitel'nyy tsentr Moskovskogo universiteta (Computer Center of Moscow University) are given next. The Center had a "Strela" electronic

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